WHAT IS CLAIMED IS:

1. A method of manufacturing a ceramic honeycomb structure in which a part of the cell ends located on an end surface of the honeycomb structure are closed, comprising the steps of:

fabricating a honeycomb structure body with the cell ends opened at the end surfaces and closing a part of the cell ends at an end surface of the honeycomb structure body, the cell end closing step including the substeps of;

attaching a film to said end surface of the honeycomb structure body in such a manner as to cover at least a part of the cell ends,

forming through holes by thermally melting or burning off the film located at the cell ends to be closed,

dipping said end surface in a slurry containing an end surface closing material thereby to cause the slurry to enter the cell ends by way of the through holes, and

hardening the slurry while at the same time removing the film.

2. A method of manufacturing a ceramic honeycomb structure according to claim 1, wherein said through holes are formed in the film by radiating a high-density energy beam to the film and thereby melting or burning off the film.

3. A method of manufacturing a ceramic honeycomb structure according to claim 2, wherein a transparent or translucent film is used and the positions to be irradiated with the high-density energy beam are determined based on the positional information of the cell ends acquired by an image processing means for recognizing the positions of the cell ends visually through the film attached to the end surface of the honeycomb structure body.

4. A method of manufacturing a ceramic honeycomb

structure according to claim 2, wherein said high-density energy beam is a laser beam.

5. A method of manufacturing a ceramic honeycomb structure according to claim 3, wherein said high-density energy beam is a laser beam.

6. A method of manufacturing a ceramic honeycomb structure in which a part of the cell ends located on the end surfaces of the ceramic honeycomb structure are closed, comprising the steps of:

fabricating a honeycomb structure body with all the cell ends open on the end surfaces;

attaching a transparent or translucent resin film in such a manner as to cover one of the end surfaces of the honeycomb structure body;

forming through holes by radiating a high-density energy beam and thus melting or burning off the resin film portions located at the cell ends to be closed;

placing the honeycomb structure body on a base with the end surface having the resin film attached thereto up and the other end surface down;

charging the masking powder by way of the through holes of the resin film and depositing the masking powder at the cell ends of the other end surface;

forming mask portions by hardening the deposited masking powder;

dipping each end surface in a slurry containing an end surface closing material, and causing the slurry to enter the cell ends by way of the through holes at the end surface having the resin film attached thereto, and by way of openings lacking the mask portions at the end surface having the mask portions; and

hardening the slurry while at the same time removing the resin film and the mask portions.

7. A method of manufacturing a ceramic honeycomb structure according to claim 6, wherein the positions to be irradiated with the high-density energy beam are

determined based on the positional information of the cell ends acquired by use of image processing means for recognizing the positions of the cell ends visually through the resin film attached to said end surfaces.

8. A method of manufacturing a ceramic honeycomb structure according to claim 6, wherein the high-density energy beam is a laser beam.

9. A method of manufacturing a ceramic honeycomb structure according to claim 6, wherein said masking powder contains thermosetting resin powder.

10. A method of manufacturing a ceramic honeycomb structure according to claim 9, wherein said masking powder contains resin powder having a different melting point from said thermosetting resin powder.

11. A method of manufacturing a ceramic honeycomb structure according to claim 9, wherein said masking powder contains a foaming agent.

12. A method of manufacturing a ceramic honeycomb structure according to claim 9, wherein said masking powder contains a fluidity improver for improving the fluidity at the time of charging the masking powder.

13. A through hole forming device for forming through holes at the desired positions of the cell ends in a transparent or translucent film attached to cover at least a part of the open cell ends at an end surface of a honeycomb structure, the device comprising:

image processing means for acquiring the positional information by recognizing the positions of the cell ends visually through the film attached to said end surface;

heat radiation means for radiating a high-density energy beam on the film; and

control means for determining the positions of the high-density energy beam radiation and thereby operating said heat radiation means based on the positional information output from said image processing means.

14. A through hole forming device according to claim 13, wherein the high-density energy beam is a laser beam.

15. A method of manufacturing a ceramic honeycomb structure in which a part of the cell ends at an end surface of the ceramic honeycomb structure is closed, wherein the process for closing a part of the cell ends of an end surface of a honeycomb structure body fabricated with the cell ends open to the end surface includes the steps of:

acquiring the positional information on the cell ends using an image processing means for recognizing the positions of the cell ends;

attaching a film to said end surface of the honeycomb structure body in such a manner as to cover at least a part of the cell ends;

forming through holes by thermally melting or burning off the portions of the film located at the cell ends to be closed based on the positional information;

dipping said end surface in a slurry containing an end surface closing material and thereby causing the slurry to enter the cell ends by way of the through holes; and

hardening the slurry while at the same time removing the film.

16. A method of manufacturing a ceramic honeycomb structure in which a part of the cell ends at an end surface thereof is closed, wherein the process of closing a part of the cell ends at an end surface of the honeycomb structure fabricated with open cell ends at the end surface includes the steps of:

acquiring the positional information on the cell ends using an image processing means for recognizing the positions of the cell ends;

forming through holes by thermally melting or burning off, based on the positional information,

portions of the film located at positions corresponding to the cell ends to be closed;

attaching a film on said end surface of the honeycomb structure body, and locating said through holes at the cell ends to be closed;

dipping said end surface in a slurry containing an end surface closing material, and causing said slurry to enter the cell ends by way of said through holes; and

hardening said slurry while at the same time removing the film.

17. A method of manufacturing a ceramic honeycomb structure according to claim 15, wherein the through holes of the film are formed by radiating a high-density energy beam on the film and thereby melting or burning off the film.

18. A method of manufacturing a ceramic honeycomb structure according to claim 16, wherein the through holes of the film are formed by radiating a high-density energy beam on the film and thereby melting or burning off the film.

19. A method of manufacturing a ceramic honeycomb structure according to claim 17, wherein said high-density energy beam is a laser beam.

20. A method of manufacturing a ceramic honeycomb structure according to claim 1, wherein said through holes are formed in the film by bringing a heated jig into contact with the film and melting or burning off the film.

21. A method of manufacturing a ceramic honeycomb structure according to claim 15, wherein said through holes are formed in the film by bringing a heated jig into contact with the film and melting or burning off the film.

22. A method of manufacturing a ceramic honeycomb structure according to claim 16, wherein said through holes are formed in the film by bringing a heated jig

into contact with the film and melting or burning off the film.

23. A method of manufacturing a ceramic honeycomb structure according to claim 1 or any one of claims 15 to 22, wherein the size of each through hole formed in the film attached to the cell ends is changed in accordance with the opening area of each cell end.

24. A method of manufacturing a ceramic honeycomb structure according to claim 1 or any one of claims 15 to 23, wherein said through holes are formed substantially in a shape about the center of gravity of the opening area of each cell end.

25. A method of manufacturing a ceramic honeycomb structure according to claim 1 or any one of claims 15 to 24, wherein said film is a resin film or a wax sheet.

26. A method of manufacturing a ceramic honeycomb structure according to claim 2 or 17, wherein said through holes are formed using a high-density energy beam in such a manner that the high-density energy beam is radiated first at the center of each through hole to be formed and the position of radiation is relatively displaced spirally to increase the diameter of the through hole to the desired size.

27. A method of manufacturing a ceramic honeycomb structure according to claim 2 or 17, wherein said through holes are formed in such a manner that the position of radiation of the high-density energy beam is fixed while the honeycomb structure body is moved to radiate the high-density energy beam at the desired position.

28. A method of manufacturing a ceramic honeycomb structure according to claim 3, wherein the image processing means produces the positional information of the cell ends in such a manner that said end surface of the honeycomb structure body is segmented into a plurality of blocks for each of which the image data for an area including the particular block and a portion

duplicated with at least a part of an adjacent block is collected for each block, and the image data for all the blocks are coupled to each other by superposing the duplicated areas thereby to produce the positional information on the cell ends for the entire surface end.

29. A method of manufacturing a ceramic honeycomb structure according to claim 15, wherein the image processing means produces the positional information of the cell ends in such a manner that said end surface of the honeycomb structure body is segmented into a plurality of blocks for each of which the image data for an area including the particular block and a portion duplicated with at least a part of an adjacent block is collected for each block, and the image data for all the blocks are coupled to each other by superposing the duplicated areas thereby to produce the positional information on the cell ends for the entire surface end.

30. A method of manufacturing a ceramic honeycomb structure according to claim 28, wherein said image processing means collects the image data using a camera fixed in position while the honeycomb structure body is moved to locate each of the blocks sequentially within the range of visual field of the camera.

31. A method of manufacturing a ceramic honeycomb structure according to claim 28, wherein said through holes are formed for each block, and in the presence of a block distant from any adjacent block immediately after completely forming the through holes for a given block, the through holes are formed for said distant block.